342.1
D. P

REPORT ON

A SURVEY OF THE 1925 INFESTATION

OF

D. PONDEROSAE IN THE KAIBAB N.F.

(made in August, 1926)

by

M. W. Blackman
Specialist in Scolytidae
U. S. Bureau of Entomology

Jan. 12, 1927

REPORT ON A SURVEY OF THE 1925 INFESTATION OF D.PONDEROSAE IN THE KAIBAB N.F. (MADE IN AUGUST, 1926)

by M.W. Blackman

During the latter part of August and first few days of September 1926 a strip survey was made of certain portions of the Kaibab Forest to determine the number of trees killed by the 1925 flight of D. Ponderosae. The work was actually done by a crew of three men, consisting of W.D.Edmonston, compassman, and G.Hofer and D.DeLeon, spotters. Forty-two and three-fourths miles of strip ten chains wide were run. Usually only one strip was run through each section examined, amounting to a 12½ per cent survey of that section. However, in certain sections a higher per cent survey was made, and in one square mile--which from previous knowledge we know contained the heaviest infestation in the entire forest--a 100% survey was made.

As the purpose was not to make a complete beetle-survey of the forest but merely to obtain a general idea of the status of the infestation, and as the data from Keen's more complete survey of last fall were already available, strips were run through only certain regions which we believed to be representative of the several conditions of the infestation. Thus, 15 miles of strip (totaling an area of 1200 acres) were run through the region west and south of Mile-and-a-Half, known to contain the heaviest infestation on the Plateau; 2½ miles (area 200 acres) was run through the Three Lakes area, known to be very lightly infested; 7½ miles (600 acres) was run through the region just east of Jacobs, which was treated in the control operation of 1925; three miles (area 240 acres) was run through the region west and south of Murray Lake, which contained some aggressive groups in the summer of 1925; 5 miles (area 400 acres) was run through the mixed forest near the main highway east of camp; 4¼ miles (area 340 acres) was run through the similar type of forest west of Pleasant Valley; 3 miles (area 240 acres) was run through the pure yellow pine forest east of Pleasant Valley; and 4 miles (320 acres) was run from Dry Park to a point just north of Bee Springs.

The very incomplete data thus obtained were checked and modified according to our general knowledge of the state of the infestation and in accordance with the topography and general character of the stand. Then estimates were made of the number of trees killed in each township, based on previous estimates made of each section examined. The following tabulation shows these final estimates. The estimates enclosed in parenthesis are taken unchanged from Keen's report of the reconnaissance of last fall, as these particular townships were not scouted either by the strip method or in a more general way:

T 39 N, R 1 E	Estimated Trees Killed	50
T 39 N, R 2 E	"	200
T 38 N, R 1 E	"	300
T 38 N, R 2 E	"	550
T 37 N, R 1 W	"	(10)*
T 37 N, R 1 E	"	455
T 37 N, R 2 E	"	1502
T 36 N, R 1 W	"	(120)
T 36 N, R 1 E	"	500
T 36 N, R 2 E	"	252
T 36 N, R 3 E	"	140
T 35 N, R 1 E	"	522
T 35 N, R 2 E	"	280
T 35 N, R 3 E	"	(70)
T 34 N, R 1 E	"	(100)
T 34 N, R 2 E	"	(390)
T 34 N, R 3 E	"	(340)
T 34 N, R 4 E	"	(60)
T 33 N, R 2 E	"	(10)
T 33 N, R 3 E	"	(210)
T 33 N, R 4 E	"	(200)
T 32 N, R 4 E	"	(50)
		6311

Probable number of trees missed - - - - 689
Estimated total for Kaibab Plateau - - 7000 trees killed in 1925

*Numbers enclosed in parenthesis are taken unchanged from Keen's report.

As will be seen, the estimate for the entire plateau totals 6,311 trees killed in 1925. This should perhaps be increased by 10 to 12 per cent to allow for trees not spotted,, thus increasing the final estimated total to 7000 trees.

Mr. Keen's estimate for the forest, based on an early fall survey, totaled 11,000 trees killed on the Plateau. The difference in the estimates may be accounted as follows: In a fall survey it is often impossible to determine whether or not a heavily-attacked tree will actually succumb. This year there was an unusually large number of attacked trees which survived, and many trees marked in the fall survey survived the attack. Also, on account of the difficulty of spotting trees in a fall survey, the actual number of trees spotted was doubled in arriving at the final estimates. Apparently the fall spotting was more efficient than was thought at the time, and in some areas the actual number of trees spotted ran very close to the number which finally succumbed, the failures in attack just about compensating for the trees missed in spotting. The greatest discrepancies in the two estimates are for the area in the heaviest infestation around Mile-and-a-Half. A complete 100% survey of Section 19 just west of camp showed a total of 265 trees killed in 1925. An allowance of 10 per cent missed trees is overgenerous, in this section at least.

Perhaps a few words of comment on each of the sections examined would give a clearer idea of our findings.

East of Jacobs Lake. 7½ miles of strip showed 39 trees killed in 1925. The estimates on three sections run about 50 per section, and one section was estimated to have 70 trees killed. However, the greater part of this region contains a much lower infestation, and in all of this area the killed trees were short and scrubby and contained scarcely any brood.

Near Junctions of Main Highway and Three Lakes Road. No strips were run in this area, but it was scouted rather thoroughly in early August in taking increments and in making counts of attack. Most sections are very free from 1925 trees, but two sections southeast of the Three Lakes Road were estimated at 25 and 30 trees respectively. The killed trees here were of a better quality than those nearer Jacobs but contained very little brood. Both this region and the one east of Jacobs are in the control area of 1925.

Three Lakes Region. Two-and-a-half miles of strip (200 acres) in this region yielded 20 trees killed in 1925. This indicates a rather higher infestation than at Jacobs, but still should be considered endemic, as the majority of the killed trees were in groups of 1, 2 or 3 and were for the most part decadent trees. The 3 sections involved were estimated at 10, 40 and 80 trees, for the sections north of Three Lakes, at Three Lakes and south of Three Lakes respectively. It is thus seen that the degree of infestation increases rapidly as we approach the heavy Mile-and-a-Half area.

Mile-and-a-Half Area. Four sections (T 37 N, R 3 E, Secs.18 and 19; T 37 N, R 1 E, Secs. 13 and 24) west of Mile-and-a-Half Park gave an estimated average of 164 trees to the section, and 3 of these sections averaged 202 per section (the highest section) on a 100% survey--yielding 265 trees.

East of Joe's Mud-Hole. Three sections west of Joe's Mud-Hole show an estimated average of 27 trees per section. The trees killed here are largely singles, and only one group of 2 trees and another of 4 trees were found in 2½ miles of strip, or 200 acres.

Murray Lake Region. Four sections near the main highway in this pure yellow pine stand gave an average estimate of 55 trees killed per section, the sections running 30, 40, 60 and 90 trees respectively. This area is just outside of the control project of 1925, and an examination of the trees last summer (1925) showed a rather aggressive brood.

Mixed Type Forest near Main Highway, east of camp. The estimated average of 5 sections in this area (based on 5 miles of strip--400 acres) is 34 trees per section. This is for the most part in the control area of 1924, and examination of the trees in 1925 showed a light brood. There has apparently been some migration into this area from the more heavily infested pure yellow pine forest to the west.

Mixed Type Forest West of Pleasant Valley. Four-and-a-quarter miles of strip (340 acres) through this area yielded only 5 trees killed in 1925, indicating an average of about 10 trees killed per section. This is believed to represent the typical condition in the area of mixed forest extending from Crane Lake to the old boundary of the Grand Canyon National Park

Region East of Pleasant Valley. The forest for several miles east of Pleasant Valley is of the pure pine type, but this area is much broken up by canyons, so the total amount of pine is not great. Slightly more than 3 miles of strip in this region yielded 7 trees killed in 1925, representing an average infestation of less than 20 trees per section. One group of 5 trees was encountered, the other two being singles.

Dry Park Area. Four miles of strip, totaling 320 acres, yielded 13 trees, indicating an average infestation of 26 trees per section. These 13 trees combined two groups of 2 trees killed and 9 singles, indicating an unmistakable endemic condition.

In nearly 43 miles of strip, totaling 3420 acres, only 3 trees attacked in 1926 were located, and none of those was classed as killed at the time of the survey. Additional scouting by the writer located only 6 additional trees attacked in 1926, and none of these was filled in at the time of the examination in August. It would thus seem that the decrease in 1926 attacks is even greater than indicated by the July brood counts. This is to be expected, for as the number of beetles in flight decrease, the efficiency of their natural enemies would increase, and a larger percentage of the attacking beetles would be killed.

This summer's work shows unmistakably that there is no immediate danger of a recurrence of epidemic conditions on the Kaibab, but the writer would like to urge that a yearly examination of the forest should be made each July for the next few years. At that time the dying trees have faded so that they are very easy to spot, and a few miles ofmstrip or even general scouting in certain typical areas should give an idea as to the status of the infestation. Along with this scouting a few trees should be felled and examined to determine the average brood and average attack per square foot. If a mid-July examination shows 3 or 4 times as many broods as attacking beetles, it is an indication that there will probably be an increase in the number of trees killed the following year. Another danger signal to be watched for is an increase in the number of trees in group killings. If these should increase to groups of 6 or 7 or more from groups of 1, 2 or 3 the previous year, that to my mind is a serious danger sign. If the brood in such larger groups is also heavy it would seem to be nearly certain that an epidemic is built up.